Installing Sync/Ethernet Link Modules in BN Platforms

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Bay Networks

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Meets requirements of:

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EN 55 022 (CISPR 22:1985), Class A <and Class B>
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Canada Requirements Only

Canada CS-03 Rules and Regulations

Note: The Canadian Department of Communications label identifies certified equipment. The certification means that the equipment meets certain telecommunications network protective operations and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent the degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Canada CS-03 -- Règles et règlements

Note: L’étiquette du ministère des Communications du Canada indique que l’appareillage est certifié, c’est-à-dire qu’il respecte certaines exigences de sécurité et de fonctionnement visant les réseaux de télécommunications. Le ministère ne garantit pas que l’appareillage fonctionnera à la satisfaction de l’utilisateur.

Avant d’installer l’appareillage, s’assurer qu’il peut être branché aux installations du service de télécommunications local. L’appareillage doit aussi être raccordé selon des méthodes acceptées. Dans certains cas, le câblage interne du service de télécommunications utilisé pour une ligne individuelle peut être allongé au moyen d’un connecteur certifié (prolongateur téléphonique). Le client doit toutefois prendre note qu’une telle installation n’assure pas un service parfait en tout temps.

Les réparations de l’appareillage certifié devraient être confiées à un service d’entretien canadien désigné par le fournisseur. En cas de réparation ou de modification effectuées par l’utilisateur ou de mauvais fonctionnement de l’appareillage, le service de télécommunications peut demander le débranchment de l’appareillage.

Pour leur propre sécurité, les utilisateurs devraient s’assurer que les mises à la terre des lignes de distribution d’électricité, des lignes téléphoniques et de la tuyauterie métallique interne sont raccordées ensemble. Cette mesure de sécurité est particulièrement importante en milieu rural.

Attention: Les utilisateurs ne doivent pas procéder à ces raccordements eux-mêmes mais doivent plutôt faire appel aux pouvoirs de réglementation en cause ou à un électricien, selon le cas.

Canada Requirements Only *(continued)*

D. O. C. Explanatory Notes: Equipment Attachment Limitations

The Canadian Department of Communications label identifies certified equipment. This certification meets certain telecommunication network protective, operational and safety requirements. The department does not guarantee the equipment will operate to the users satisfaction.

Before installing the equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

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Notes explicatives du ministère des Communications: limites visant les accessoires

L'étiquette du ministère des Communications du Canada indique que l'appareillage est certifié, c'est-à-dire qu'il respecte certaines exigences de sécurité et de fonctionnement visant les réseaux de télécommunications. Le ministère ne garantit pas que l'appareillage fonctionnera à la satisfaction de l'utilisateur.

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Attention: Les utilisateurs ne doivent pas procéder à ces raccordements eux-mêmes mais doivent plutôt faire appel aux pouvoirs de réglementation en cause ou à un électricien, selon le cas.

Canada Requirements Only *(continued)*

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This digital apparatus (Access Feeder Node, Access Link Node, Access Node, Access Stack Node, Backbone Concentrator Node, Backbone Concentrator Node Switch, Backbone Link Node, Backbone Link Node Switch, Concentrator Node, Feeder Node, Link Node) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Réglement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (Access Feeder Node, Access Link Node, Access Node, Access Stack Node, Backbone Concentrator Node, Backbone Concentrator Node Switch, Backbone Link Node, Backbone Link Node Switch, Concentrator Node, Feeder Node, Link Node) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Réglement sur le brouillage radioélectrique du ministère des Communications du Canada.

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About This Guide

Read this guide if you are responsible for installing any of the following Bay Networks™ link modules in a Backbone Node (BN®) platform:

- Single Sync/Single Ethernet
- Dual Sync/Single Ethernet
- Dual Sync/Dual Ethernet
- Dual Sync/Dual Ethernet High-Speed Filters
- Ethernet Synchronous Advanced Filtering-4

This guide describes how to

- Prepare for installation and configure the link module jumpers, if necessary
- Install the link module in a Backbone Link Node (BLN®), BLN-2, and Backbone Concentrator Node (BCN®)
- Interpret the LEDs on the link module

This guide also describes requirements for cabling the link module (Appendix A) and for operating it in Europe (Appendix B).

Note: Experienced network operators can safely perform the user-serviceable procedures described in this book; however, only authorized Bay Networks service technicians can perform other maintenance procedures not described in this book.

Conventions

bold text	Indicates text that you need to enter and command names in text. Example: Use the **dinfo** command.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.

Acronyms

ESAF-4	Ethernet Synchronous Advanced Filtering-4
ILI	Intelligent Link Interface
LED	light-emitting diode
SELV	safety extra-low voltage
TNV	telecommunications network voltage

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Asia/Pacific Region	(612) 9927-8800	(612) 9927-8811
Latin America	(407) 997-1713	(407) 997-1714

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Valbonne, France	(33) 92-968-968	(33) 92-966-998
Sydney, Australia	(612) 9927-8800	(612) 9927-8811
Tokyo, Japan	(81) 3-5402-0180	(81) 3-5402-0173

Chapter 1
Preparing for Installation

Note: In this guide, the term Sync/Ethernet link module includes all models of the Sync/Ethernet link module, unless referring to a specific model.

Depending on your configuration, complete these preliminary tasks as needed to install the link module:

- Choose a slot
- Remove a link module
- Configure jumper settings

Choosing a Slot

You can install the link module in

- Slots 2 through 5 in the BLN platform (Figure 1-1)
- Slots 2 through 5 in the BLN-2 platform (Figure 1-2)
- Slots 1 through 6 and Slots 8 through 14 in the BCN platform (Figure 1-3)

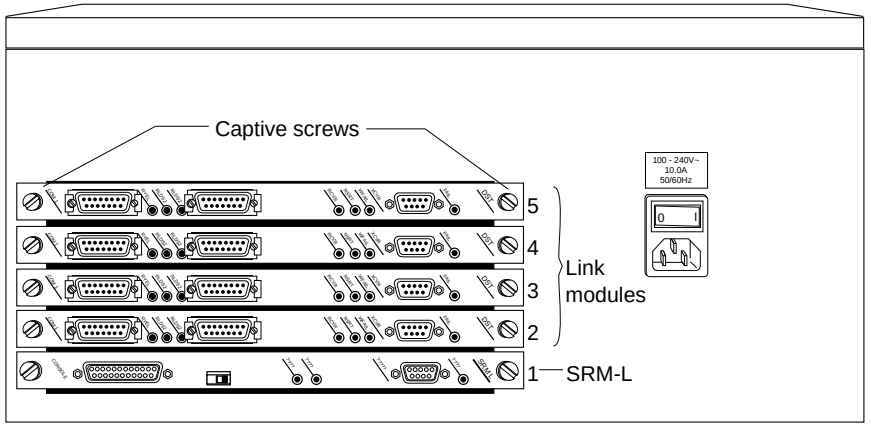


Figure 1-1. Link Module Slots in a BLN Platform

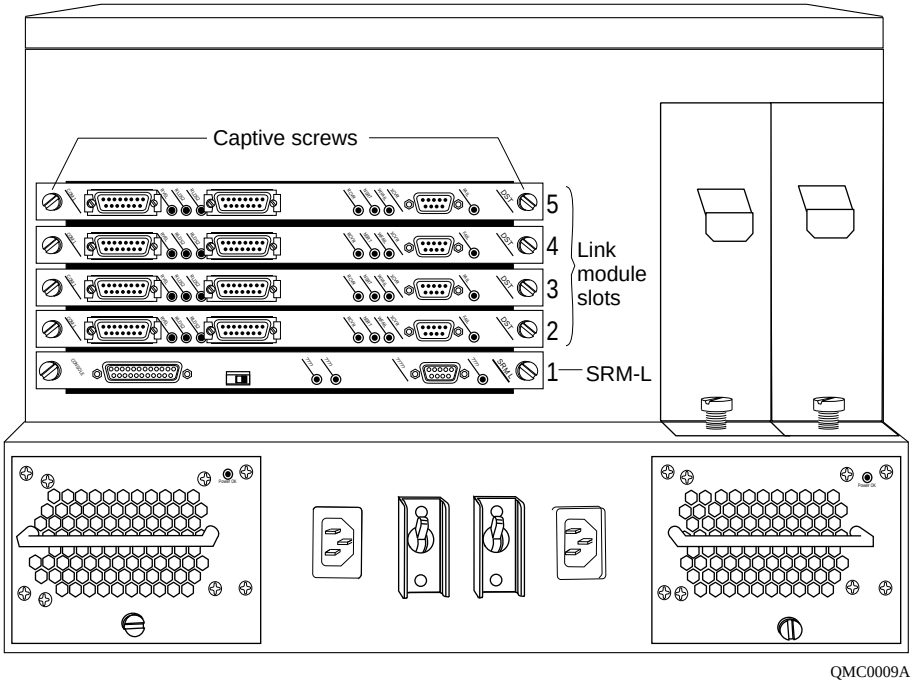


Figure 1-2. Link Module Slots in a BLN-2 Platform

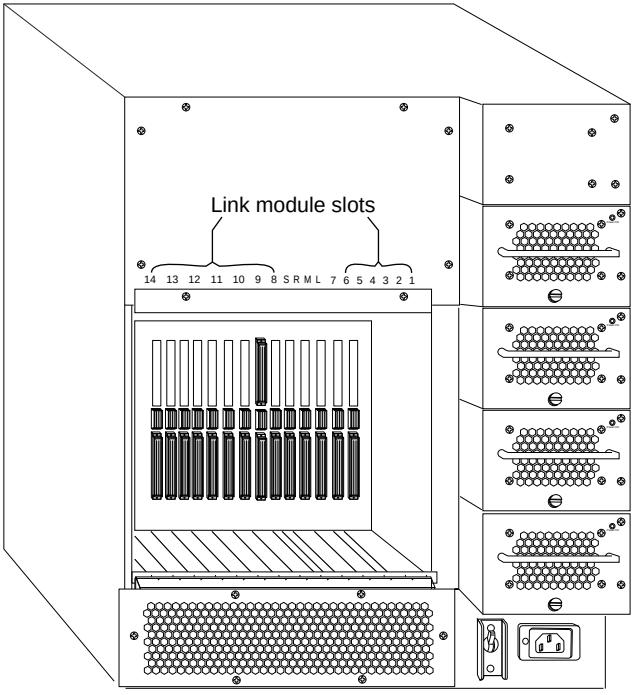


Figure 1-3. Link Module Slots in a BCN Platform

Removing a Link Module

If there are no empty slots in your BN platform, you must remove a link module to install the Sync/Ethernet link module. When replacing a configured link module, you must delete all configured circuits (ports) on the slot so the BN platform software can properly configure the new link module.

Refer to *Configuring Routers* if you use router software or *Administration Guide* if you use BayStream software for instructions on editing a configuration file and deleting circuits.

The Backbone Node hot-swap feature allows you to remove or replace a link module with the chassis power on or off.

Danger: Do not remove more than two adjacent modules with the power on.

When you remove a link module with the power on, the services that slot provides become disrupted. After the slot fails to receive packets, the other link modules in the chassis resynchronize their routing tables and continue uninterrupted.

The procedure for removing a link module is the same for the BLN, BLN-2, and BCN platforms:

1. **Disconnect any exterior cables from the link module.**
2. **Attach an antistatic wrist strap.**

   BN platforms and link modules ship with an antistatic wrist strap. You must wear one of these straps when accessing components on BN platforms. The antistatic wrist strap directs the discharge of static electricity from your body to the chassis, thereby avoiding discharge and possible damage to sensitive electronic components.

Caution: Electrostatic discharge can damage hardware. Always use the antistatic wrist strap when handling any component on your BN platform.

3. **Loosen the captive screw on each end of the module.**
4. **Grasp the sides of the module and pull it out of the slot.**
5. **Place the module in an antistatic protective bag.**

Configuring Jumper Settings

The following Sync/Ethernet link modules contain at least one user-configurable jumper setting:

- Single Sync/Single Ethernet (Order No. 5410)
- Dual Sync/Single Ethernet (Order No. 5420)
- Dual Sync/Dual Ethernet (Order No. 5430)
- Dual Sync/Dual Ethernet High-Speed Filters (Order No. 5530)
- Ethernet Synchronous Advanced Filtering-4 (Order No. 5532)

Before you install a Sync/Ethernet link module, make sure the jumper settings on the link module match your configuration. The following sections describe only the user-configurable jumper settings; changing the settings of any other jumpers on the link module can jeopardize module functioning.

Setting Jumpers on the Single Sync/Single Ethernet Link Module

Figure 1-4 shows the user-configurable jumpers on the Single Sync/Single Ethernet link module (Order No. 5410).

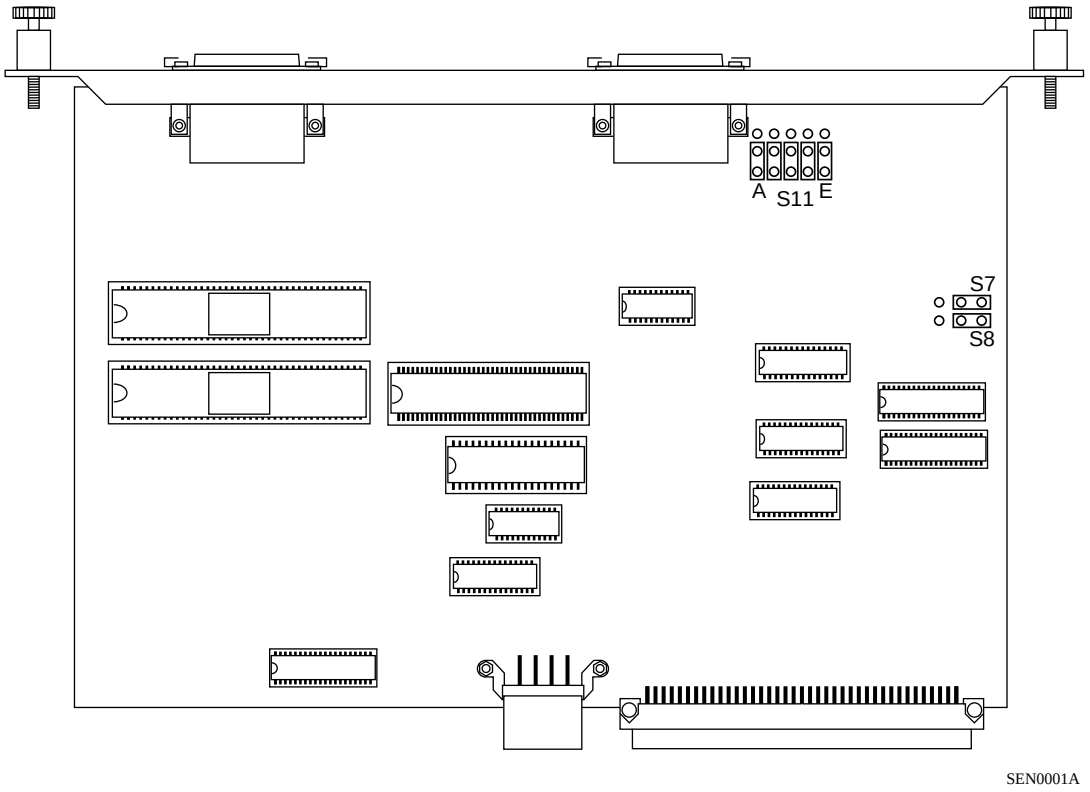
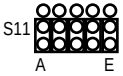
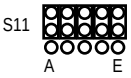
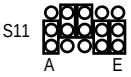


Figure 1-4. Jumpers on the Single Sync/Single Ethernet Link Module

Before installing the Single Sync/Single Ethernet link module, refer to Table 1-1 to ensure that the user-configurable jumper settings on the link module match your configuration.

Table 1-1. Single Sync/Single Ethernet Jumper Settings

Option	Setting	Jumper
Interface voltage ±5 or ±12	±12 for RS-232, V.28, V.35	
	±5 for RS-423*	
Com 1	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	

*. These jumpers determine the output voltage levels on the unbalanced driver devices. We recommend that you leave the jumpers in the ±12V position for correct unbalanced operation.

† When configuring for V.35, place the S11 jumpers (A through E) in the unbalanced position to support V.35/V.28 control signals.

Setting Jumpers on the Dual Sync/Single Ethernet Link Module

Figure 1-5 shows the user-configurable jumpers on the Dual Sync/Single Ethernet link module (Order No. 5420).

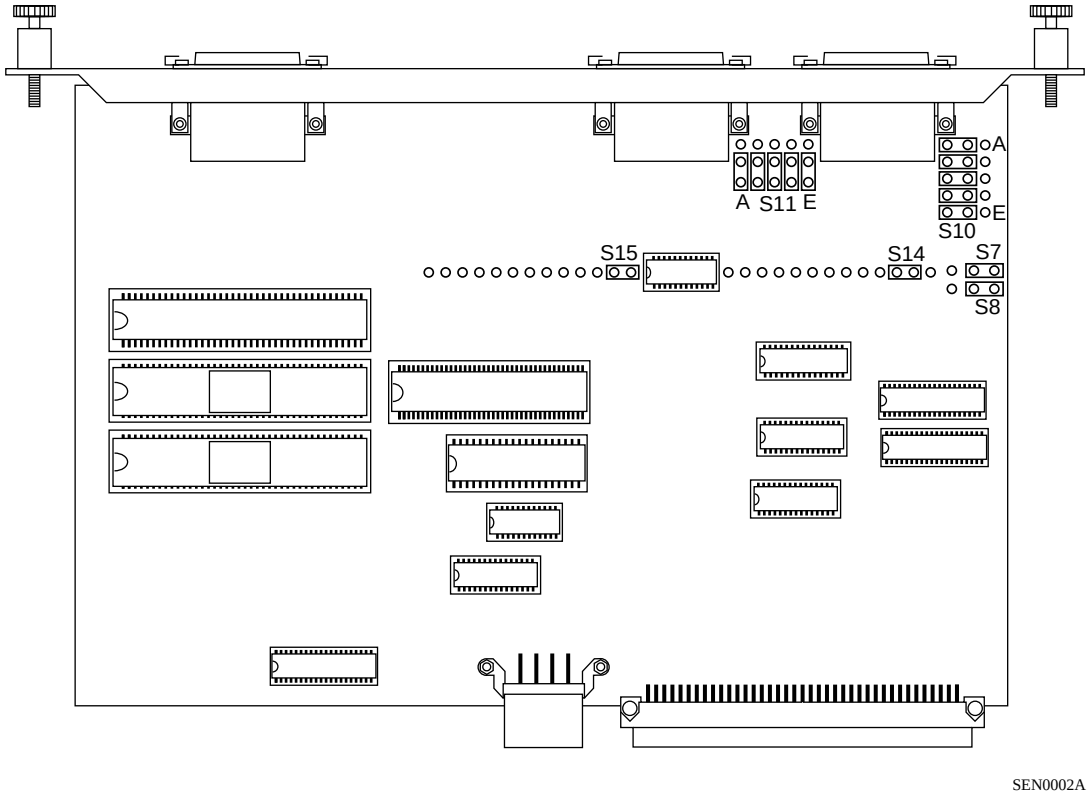
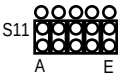
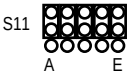
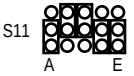
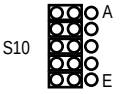
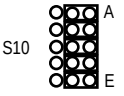
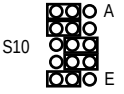


Figure 1-5. Jumpers on the Dual Sync/Single Ethernet Link Module

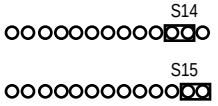
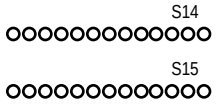
Before installing the Dual Sync/Single Ethernet link module, refer to Table 1-2 to ensure that the user-configurable jumper settings on the link module match your configuration.

Table 1-2. Dual Sync/Single Ethernet Jumper Settings

Option	Setting	Jumper
Interface voltage ±5 or ±12	±12 for RS-232, V.28, V.35	
	±5 for RS-423*	
Com 1	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	
Com 2	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	

(continued)

Table 1-2. Dual Sync/Single Ethernet Jumper Settings *(continued)*

Option	Setting	Jumper
Installation of V.35 daughterboard	V.35 daughterboard not installed	
	V.35 daughterboard installed	

*. These jumpers determine the output voltage levels on the unbalanced driver devices. We recommend that you leave the jumpers in the ±12V position for correct unbalanced operation.

† When configuring for V.35, place the S11 jumpers (A through E) in the unbalanced position to support V.35/V.28 control signals.

Setting Jumpers on the Dual Sync/Dual Ethernet Link Module

Figure 1-6 shows the user-configurable jumpers on the Dual Sync/Dual Ethernet link module (Order No. 5431).

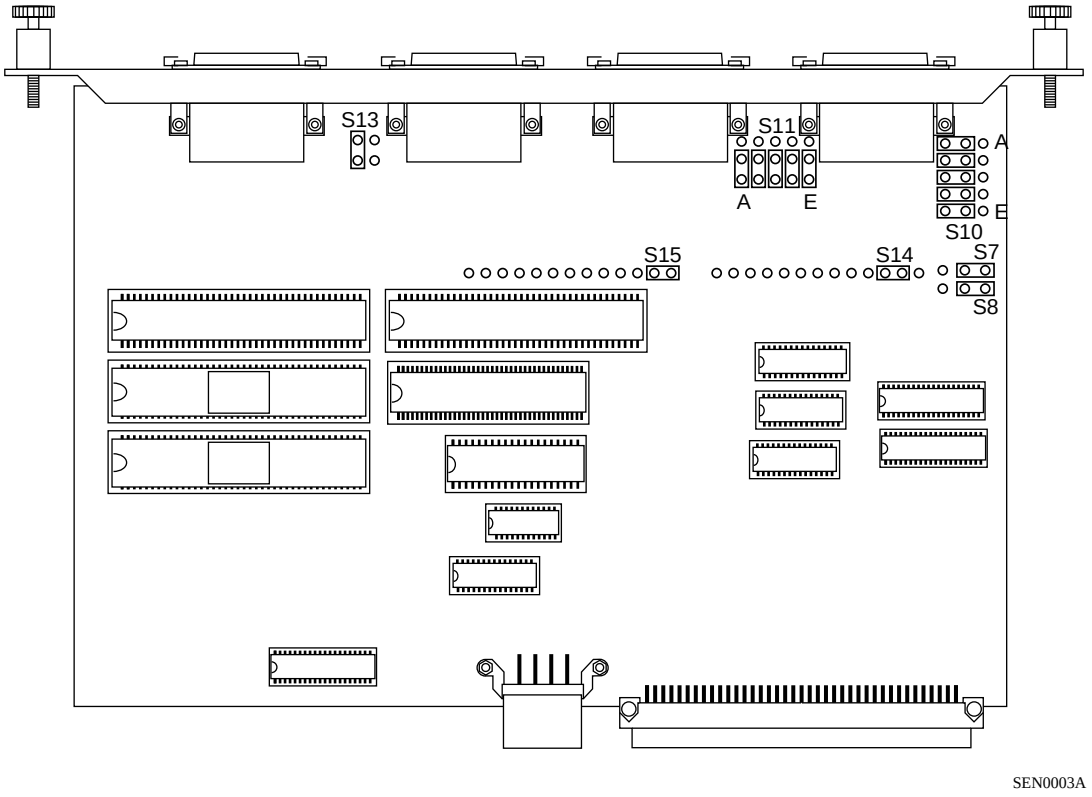
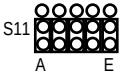
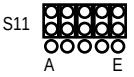
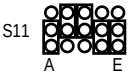
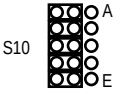
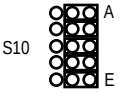
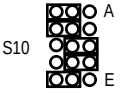


Figure 1-6. Jumpers on the Dual Sync/Dual Ethernet Link Module

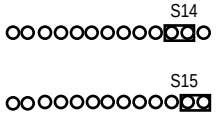
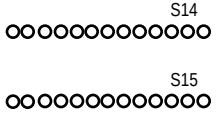
Before installing the Dual Sync/Dual Ethernet link module, refer to Table 1-3 to ensure that the user-configurable jumper settings on the link module match your configuration.

Table 1-3. Dual Sync/Dual Ethernet Jumper Settings

Option	Setting	Jumper
Interface voltage ±5 or ±12	±12 for RS-232, V.28, V.35	
	±5 for RS-423*	
Com 1	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	
Com 2	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	

(continued)

Table 1-3. Dual Sync/Dual Ethernet Jumper Settings *(continued)*

Option	Setting	Jumper
Installation of V.35 daughterboard	V.35 daughterboard not installed	
	V.35 daughterboard installed	

*. These jumpers determine the output voltage levels on the unbalanced driver devices. We recommend that you leave the jumpers in the ±12V position for correct unbalanced operation.

†. When configuring for V.35, place the S10 jumpers (A through E) in the unbalanced position to support V.35/V.28 control signals.

Setting Jumpers on the Dual Sync/Dual Ethernet High-Speed Filters Link Module

Figure 1-7 shows the user-configurable jumpers on the Dual Sync/Dual Ethernet High-Speed Filters link module (Order No. 5530).

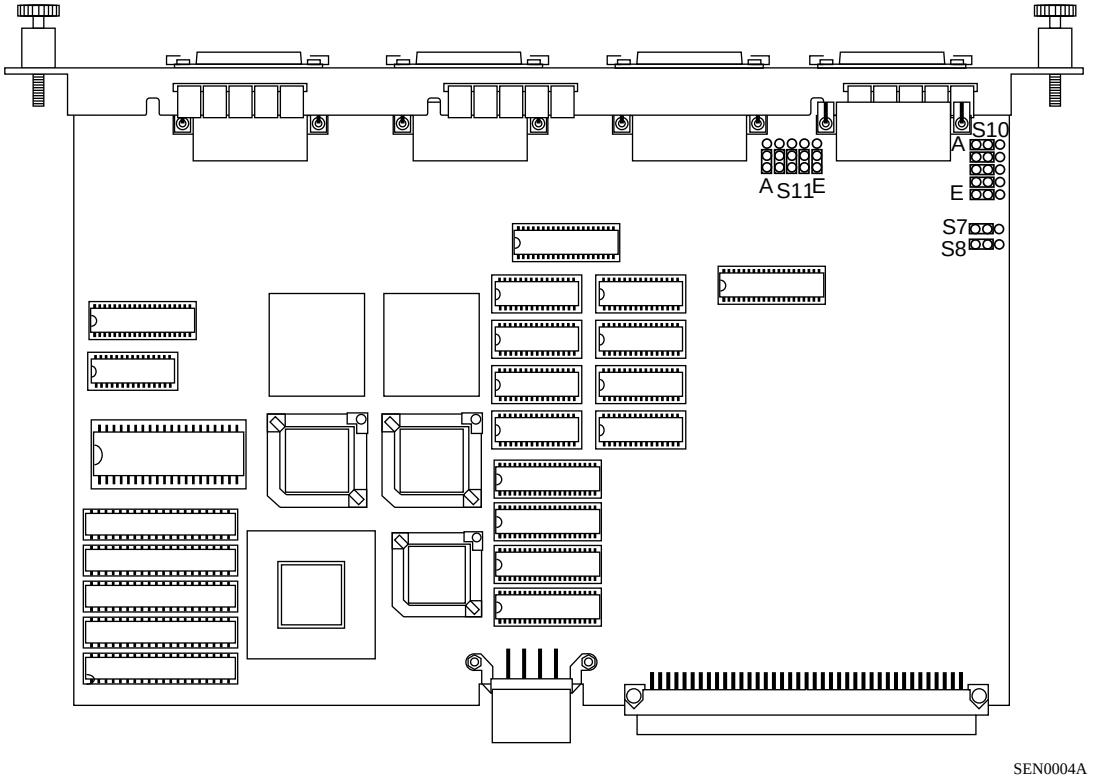
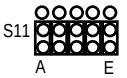
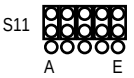
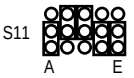
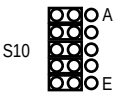
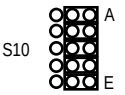
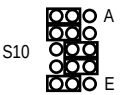


Figure 1-7. Jumpers on the Dual Sync/Dual Ethernet High-Speed Filters Link Module

Before installing the Dual Sync/Dual Ethernet High-Speed Filters link module, refer to Table 1-4 to ensure that the user-configurable jumper settings on the link module match your configuration.

Table 1-4. Dual Sync/Dual Ethernet High-Speed Filters Jumper Settings

Option	Setting	Jumper
Interface voltage ±5 or ±12	±12 for RS-232, V.28, V.35	
	±5 for RS-423*	
Com 1	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	
Com 2	Unbalanced signal for RS-232, RS-423, V.28†	
	Balanced signal for X.21*	
	Balanced signal for RS-422*	

*. These jumpers determine the output voltage levels on the unbalanced driver devices. We recommend that you leave the jumpers in the ±12V position for correct unbalanced operation.

† When configuring for V.35, place the S10 and S11 jumpers (A through E) in the unbalanced position to support V.35/V.28 control signals.

Setting Jumpers on the Ethernet Synchronous Advanced Filtering-4 Link Module

Figure 1-8 shows the user-configurable jumpers on the Ethernet Synchronous Advanced Filtering-4 link module (Order No. 5532).

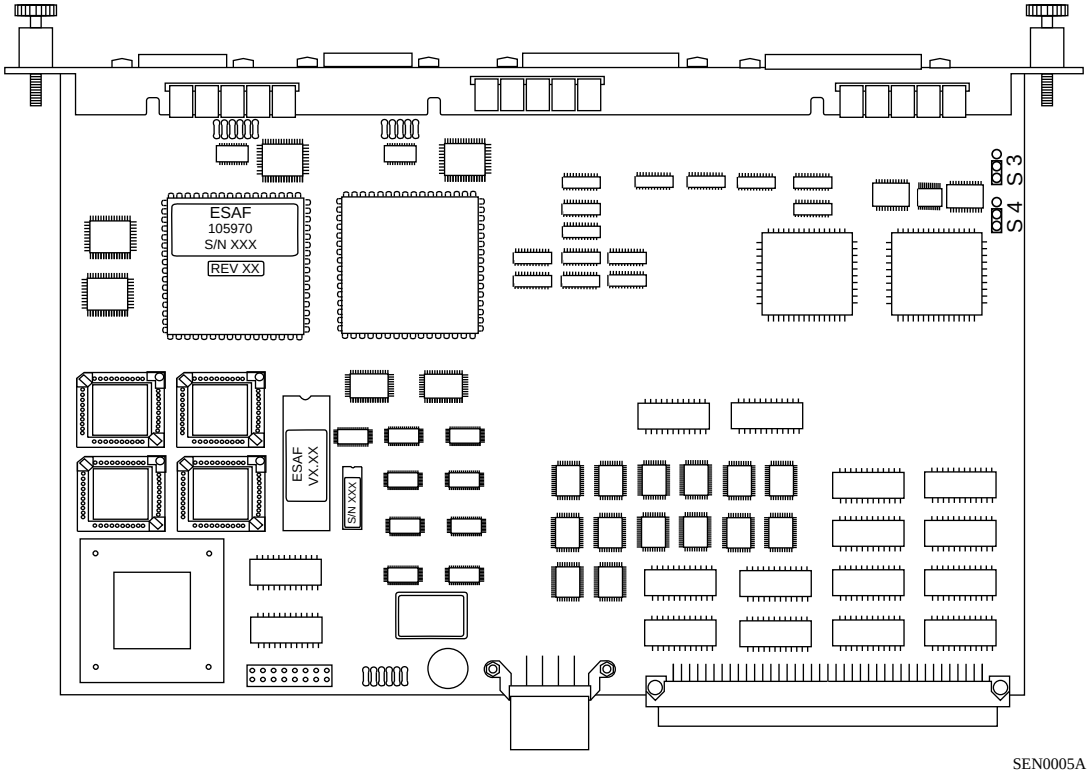
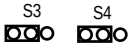


Figure 1-8. Jumpers on the Ethernet Synchronous Advanced Filtering-4 Link Module

Before installing the Ethernet Synchronous Advanced Filtering-4 link module, refer to Table 1-5 to ensure that the user-configurable jumper settings on the link module match your configuration.

Table 1-5. Ethernet Synchronous Advanced Filtering-4 Jumper Settings

Option	Setting	Jumper
Interface voltage ±5 or ±12	±12 for RS-232	
	±5 for RS-422, V.35*	

*. These jumpers determine the output voltage levels on the unbalanced driver devices. We recommend that you leave the jumpers in the ±12V position for correct unbalanced operation.

Chapter 2
Installing the Link Module

Complete the steps in this chapter to install the Sync/Ethernet link module in your BLN, BLN-2, or BCN platform.

Inserting the Link Module

Install the link module in the BLN, BLN-2, or BCN platform as follows:

1. **Attach an antistatic wrist strap.**

   BN platforms and link modules ship with an antistatic wrist strap. You must wear one of these straps whenever you access components in a platform.

   The antistatic wrist strap directs the discharge of static electricity from your body to the chassis, thereby avoiding discharge and possible damage to sensitive electronic components.

Caution: Electrostatic discharge can damage hardware. Always use the antistatic wrist strap when handling any router components.

2. **Slide the module into the appropriate slot, using the slot card guides.**

   Refer to Figure 1-1 (BLN), 1-2 (BLN-2), or 1-3 (BCN) for slot locations.

3. **Insert the module until its connector panel touches the router back panel.**

4. **Secure the captive screw on each end of the module (Figure 2-1).**

   Figure 2-1 shows the captive screws on a Single Sync/Single Ethernet link module; these screws are the same on all link modules.

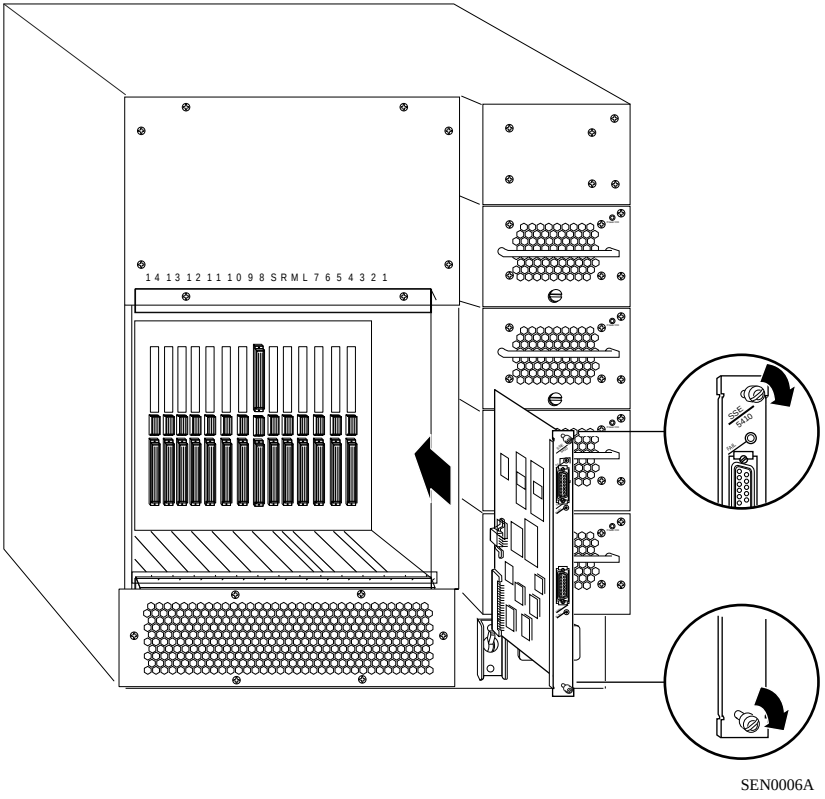


Figure 2-1. Link Module Captive Screws (BCN Example)

5. **Once you are done accessing the interior of the chassis, remove the antistatic wrist strap.**

Connecting Cables

Connect the appropriate cabling to the link module ports.

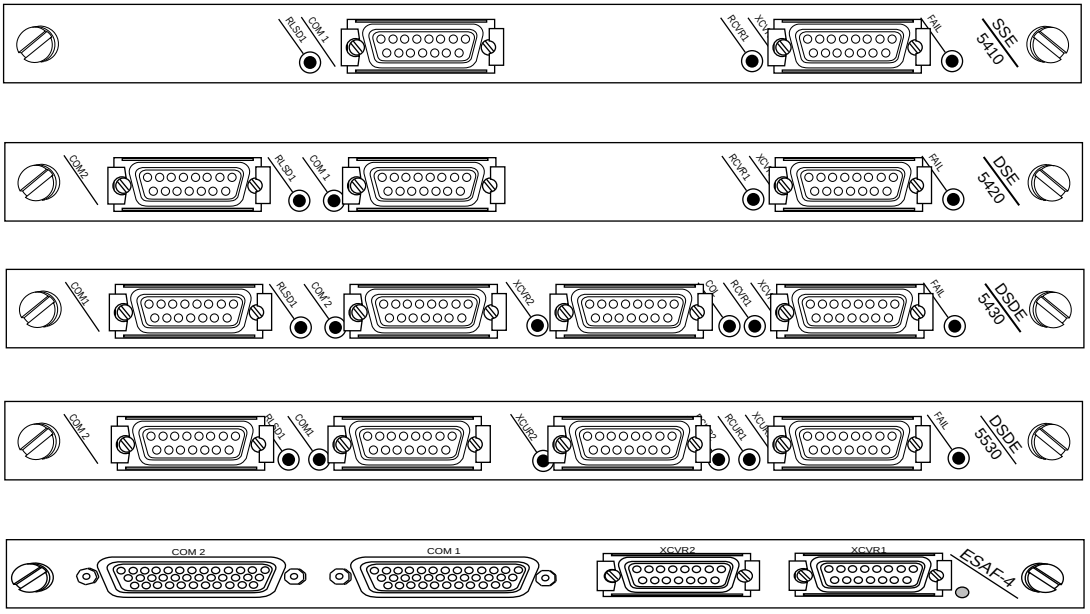
Refer to the cable guide for information about the cables Bay Networks supports for link modules.

Chapter 3
Checking Status Indicators

This chapter describes the status indicator lights (LEDs) on the Sync/Ethernet link modules. Use the LEDs to verify that the link module is operating after installation.

Note: We recommend that you issue the **diags** command to the associated slot, using the Bay Networks Technician Interface, immediately after you insert a link module. (Refer to *Using Technician Interface Software* if you use router software or *Troubleshooting and Testing* if you use BayStream software.) Otherwise, the link module FAIL LED will remain lit, indicating that diagnostics have not run on the Intelligent Link Interface (ILI). However, even if you do not issue the **diags** command, the link module initializes and becomes operational as long as the board functions properly and contains the correct interface configurations.

Figure 3-1 shows the LEDs on the Sync/Ethernet link modules. Table 3-1 describes the Sync LED functions and Table 3-2 describes the Ethernet LED functions.



SEN0007A

Figure 3-1. Sync/Ethernet LEDs

Table 3-1. Functions of the Synchronous LEDs

LED	Function
RLSD1, COM1 or COM2	Indicates Carrier Detect is present on the respective port.
FAIL	Indicates one of the following conditions: • Diagnostic testing is in progress. Diagnostic testing occurs when you cold-start the module. You cold-start the module when you cycle power, issue the **diags** command from the Technician Interface, or hot-swap the link module. This LED blinks three times and turns off when the diagnostic testing terminates successfully. • Power-up diagnostic testing failed and the link module is waiting for an automatic attempt to reinitiate diagnostic testing. If the FAIL LED turns on again, call the Bay Networks Technical Response Center. • A catastrophic failure due to a hardware problem on the link module occurred and the link module is waiting for an automatic attempt to reinitiate diagnostic testing. If the FAIL LED turns on again, call the Bay Networks Technical Response Center.

Table 3-2. Functions of the Ethernet LEDs

LED	Function
COL	Indicates a collision detection.
RCVR1 or RCVR2	Indicates that the respective port is receiving data.
XCVR1 or XCVR2	Indicates the presence of Ethernet traffic (either transmitting or receiving) on the respective port.
FAIL	Indicates one of the following: • Diagnostic testing is in progress. Diagnostic testing occurs when you cold-start the module. You cold-start the module when you cycle power, issue the **diags** command from the Technician Interface, or hot-swap the link module. This LED blinks three times and goes out when the diagnostic testing terminates successfully. • Power-up diagnostic testing failed and the link module is waiting for an automatic attempt to reinitiate diagnostic testing. If the FAIL LED turns on again, call the Bay Networks Technical Response Center. • A link module hardware problem exists and the link module is waiting for an automatic attempt to reinitiate diagnostic testing. If the FAIL LED turns on again, call the Bay Networks Technical Response Center.

Appendix A
Cabling Requirements for the Link Modules

This appendix provides technical information about cabling requirements for the ESAF link modules (Order Nos. 5431, 5531, 5532).

V.28 compliance requires the use of an Order No. 7837 cable; V.35 compliance requires an Order No. 7220 cable; X.21 compliance requires an Order No. 7224 cable. Refer to the following tables and illustrations for cabling information.

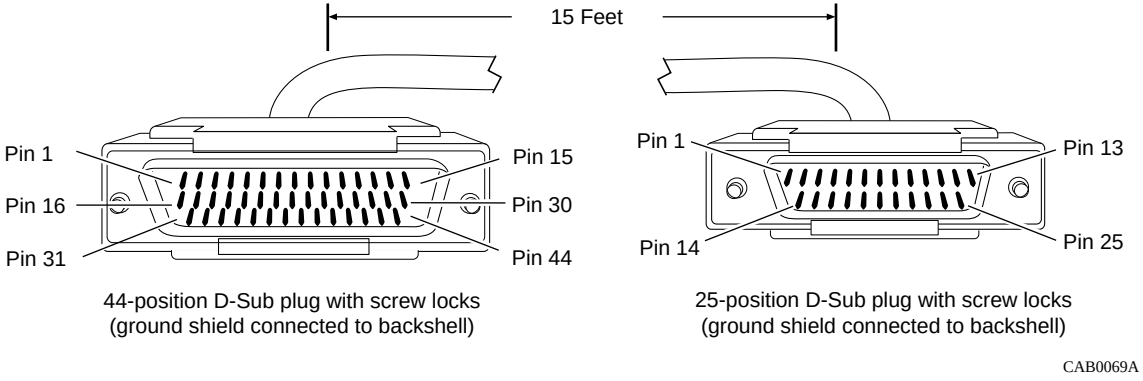


Figure A-1. V.28 to WAN Interface Cable (Order No. 7837)

Table A-1. V.28 to WAN Interface Cable (Order No. 7837) Pin Assignments

Bay Networks Termination		**Remote Termination**	
Pin	**Signal**	**Pin**	**Signal**
1	Frame Ground	1	Frame Ground
2	Send Data+	2	Send Data
3	Receive Data+	3	Receive Data
4	Request to Send+	4	Request to Send
5	Clear to Send+	5	Clear to Send
6	Data Set Ready+	6	Data Set Ready
8	Data Terminal Ready+	20	Data Terminal Ready
9	Data Carrier Detect+	8	Data Carrier Detect
10	Send Timing+	15	Send Timing
11	Receive Timing+	17	Receive Timing
12	Xmitter Signal Element Timing+	24	Xmitter Signal Element Timing
7	Signal Ground	7	Signal Ground
Local Wire Connections			
Pin 7 -> 19 -> 20-> 23			
Pin 13 -> 28			
Pin 14 -> 29			

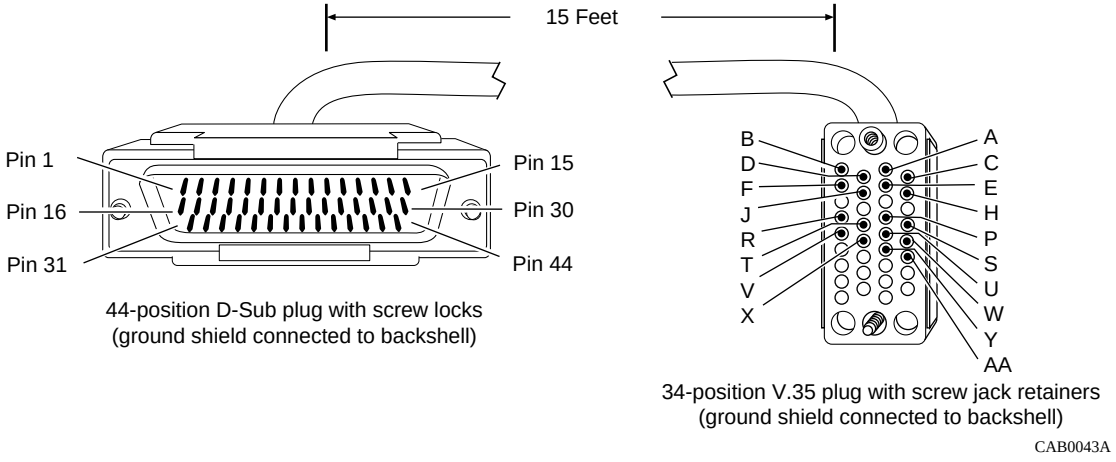


Figure A-2. V.35 WAN Interface Cable (Order No. 7220)

Table A-2. V.35 WAN Interface Cable (Order No. 7220) Pin Assignments

Bay Networks Termination		**Remote Termination**	
Pin	**Signal**	**Pin**	**Signal**
38	VSD+	P	Send Data A
36	VSD-	S	Send Data B
34	VRT+	V	Receive Timing A
33	VRT-	X	Receive Timing B
32	VST+	Y	Send Timing A
31	VST-	AA	Send Timing B
37	VRD+	R	Receive Data A
35	VRD-	T	Receive Data B
6	Data Set Ready+	E	Data Set Ready
8	Data Terminal Ready+	H	Data Terminal Ready
4	Request to Send+	C	Request to Send
5	Clear to Send+	D	Clear to Send
40	VTT+	U	Terminal Timing A

(continued)

Table A-2. V.35 WAN Interface Cable (Order No. 7220) Pin Assignments *(continued)*

Bay Networks Termination		Remote Termination	
Pin	**Signal**	**Pin**	**Signal**
39	VTT-	W	Terminal Timing B
1	Frame Ground	A	Frame Ground
9	Data Carrier Detect+	F	Data Carrier Detect
19	Signal Ground	B	Signal Ground
Local Wire Connections			
Pin 19 -> 20 -> 23 -> 7			
Pin 41 -> 42 -> 43			
Pin 13 -> 28			
Pin 14 -> 29			

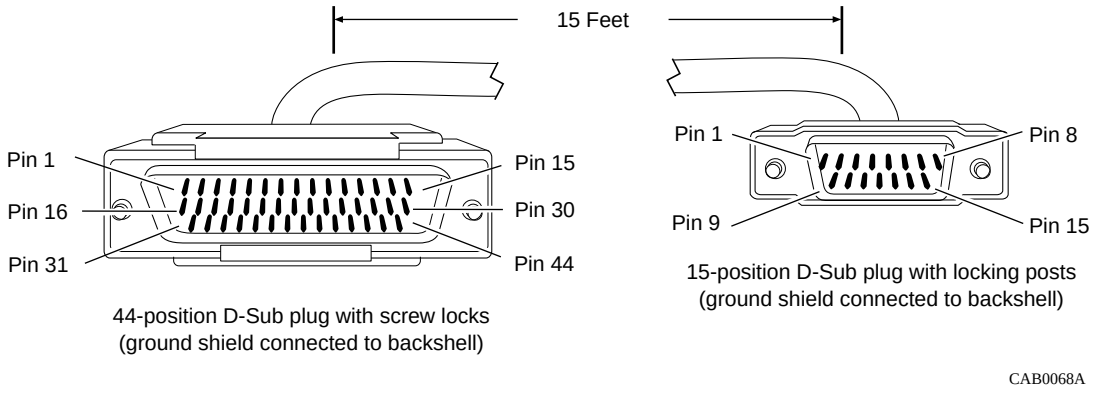


Figure A-3. X.21 WAN Interface Cable (Order No. 7224)

Table A-3. X.21 WAN Interface Cable (Order No. 7224) Pin Assignments

Bay Networks Termination		Remote Termination	
Pin	**Signal**	**Pin**	**Signal**
2	Send Data+	2	Send Data A
16	Send Data-	9	Send Data B
4	Request to Send+	3	Control A
18	Request to Send-	10	Control B
3	Receive Data+	4	Receive Data A
17	Receive Data-	11	Receive Data B
9	Data Carrier Detect+	5	Indication A
23	Data Carrier Detect-	12	Indication B
10	Send Timing+	6	Timing A
24	Send Timing-	13	Timing B
7	Signal Ground	8	Signal Ground
1	Frame Ground	1	Frame Ground
Local Wire Connections			
Pin 41 -> 43			
Pin 28 -> 30			
Pin 14 -> 15			

Appendix B
Requirements for European Operation

This appendix provides technical specifications and notes about operating the following link modules in Europe.

- Single Sync/Single Ethernet (Order No. 5410)
- Dual Sync/Single Ethernet (Order No. 5420)
- Dual Sync/Dual Ethernet (Order No. 5431)
- Ethernet Synchronous Advanced Filtering (Order No. 5532)

Installation Requirements

The link modules are approved only for installation in a host, and with host attachments, which are either type approved for such apparatus or, if supplied after March 1, 1989, are marked with or supplied with a statement that the host is supplied under the terms of General Approval No. NS/G/1234/J/100003.

Installation of the link modules in a BLN, BLN-2, or BCN platform will satisfy the conditions stated in this appendix. The BLN, BLN-2, and BCN platforms are supplied under the terms of General Approval NS/G/1234/J/100003.

Power Requirements

The link modules are powered from the host chassis and have the power requirements shown in Table B-1.

Table B-1. Link Module Power Requirements

Voltage	Amperage
+5 V	5 A
+12 V	0.75 A
-12 V	0.75 A

The power drawn from the host chassis, combined with that required for any other link modules and accessories, must be within the power rating of the host chassis.

You must install the link modules so as not to impair the integrity of the network protection from hazardous voltages used or generated internally by the host chassis.

Clearances and Creepage Distances

You must maintain the clearances and creepage distances (shown as X and Y, respectively, in Table B-2 and Figure B-1) between the link module and

- The host chassis in which it is installed
- Any adjacent link modules installed in the host chassis

The exception to this rule is the edge connector, which is located in the host chassis backplane, where no minimum distance applies.

Table B-2. Link Module Clearances and Creepage Distances

Clearance (X)	Creepage (Y)	Voltage Used or Generated by Other Parts of the Host or Expansion Card
2.0 mm	2.4 (3.8) mm	Up to 50 V rms or V dc
2.6 mm	3.0 (4.8) mm	Up to 125 V rms or V dc
4.0 mm	5.0 (8.0) mm	Up to 250 V rms or V dc
4.0 mm	6.4 (10.0) mm	Up to 300 V rms or V dc

The creepage distances apply to the normal office environment. When the local environment within the host chassis is subject to conductive pollution or dry nonconductive pollution that could become conductive due to condensation, the creepage distances shown in parentheses in Table B-2 will apply.

The clearance and creepage distance between adjacent points should be checked as follows (Figure B-1):

- The clearance distance (X) is the shortest distance between two points measured through the air.
- The creepage distance (Y) is the shortest distance between two points measured across a surface.

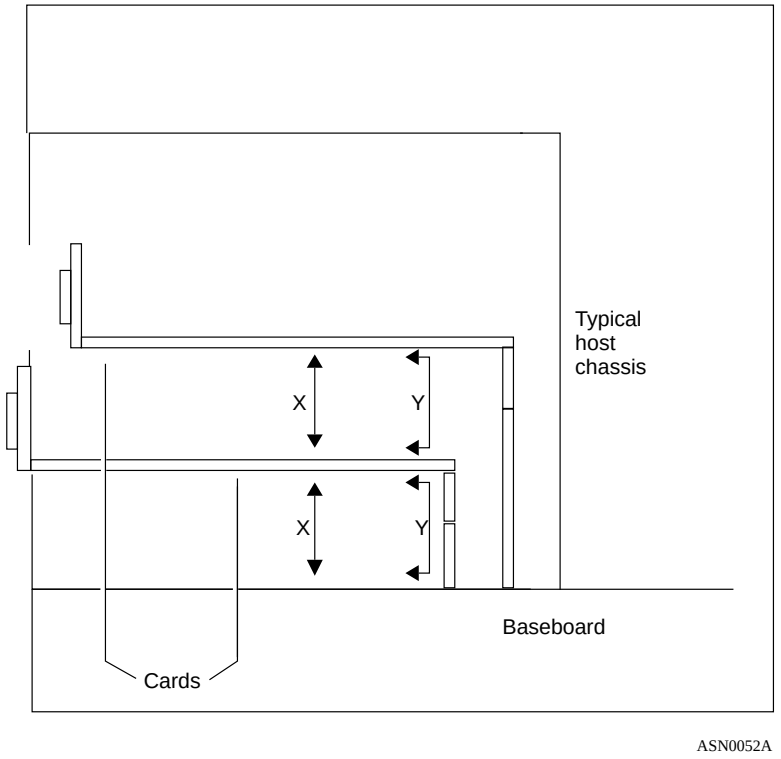


Figure B-1. Link Module Clearances and Creepage Distances

You should obtain advice from a competent telecommunications safety engineer if in doubt.

Failure to install a link module according to these instructions will invalidate the Approval.

European Safety Status

The tables in this section detail the safety status of each product as defined by European Standard EN41003.

Safety Status (Order No. 5410)

Table B-3 shows the safety status of interconnection points to the connection of other equipment.

Table B-3. Safety Status (Order No. 5410)

Port Location	Port Description	Type of Circuit
COMM1	V.28, X.21, V.35	Telecommunications network voltage (TNV) @ safety extra-low voltage (SELV) levels
P1	Host Port	SELV
J5	Host Power	SELV

Safety Status (Order No. 5420)

Table B-4 shows the safety status of interconnection points to the connection of other equipment.

Table B-4. Safety Status (Order No. 5420)

Port Location	Port Description	Type of Circuit
COMM1	V.28, X.21, V.35	TNV @ SELV levels
COMM2	V.28, X.21, V.35	TNV @ SELV levels
XCVR1	Ethernet	SELV
P1	Host Port	SELV
J5	Host Power	SELV

Safety Status (Order No. 5431)

Table B-5 shows the safety status of interconnection points to the connection of other equipment.

Table B-5. Safety Status (Order No. 5430)

Port Location	Port Description	Type of Circuit
COMM1	V.28, X.21, V.35	TNV @ SELV levels
COMM2	V.28, X.21, V.35	TNV @ SELV levels
XCVR1	Ethernet	SELV
XCVR2	Ethernet	SELV
P1	Host Port	SELV
J5	Host Power	SELV

Safety Status (Order No. 5532)

Table B-6 shows the safety status of interconnection points to the connection of other equipment.

Table B-6. Safety Status (Order No. 5532)

Port Location	Port Description	Type of Circuit
COMM1	V.28, X.21, V.35	TNV @ SELV levels
COMM2	V.28, X.21, V.35	TNV @ SELV levels
XCVR1	Ethernet	SELV
XCVR2	Ethernet	SELV
J5	Host Port	SELV
J6	Host Port	SELV